

Thermogalvanic Corrosion

62-1-3/21

ASSOCIATION: Academy of Sciences USSR, Institute of Physical Chemistry

PRESENTED BY:

SUBMITTED: June 26, 1956

AVAILABLE: Library of Congress

Card 3/3

GERASIMOV, V.V.

USSR /Chemical Technology. Chemical Products
and Their Application
Corrosion. Protection from corrosion.

H-4

Abs Jour: Referat Zhur - Khimiya, No 1, 1958, 1588

Author : Gerasimov V.V.

Inst : Academy of Sciences USSR

Title : Protective Potentials of Metals

Orig Pub: Izv. AN SSSR, Otd. khim. n., 1957, No 3,
263-269

Abstract: An analysis is made of the available methods for
calculating the values of protective potentials
of metals, and the unsound nature of these methods
is demonstrated. A method of calculating the pro-

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and Their Application
Corrosion. Protection from Corrosion.

4-4

Abs Jour: Referat Zhur - Khimiya, No 1, 1958, 1588

protective potentials is proposed, which is based on the assumption of the existence of an exponential correlation between rate of corrosion (RC) of the metal and its potential (on the condition that ionization of the metal constitutes the controlling stage of the process). The calculation formula is of the following form: $\varphi_z = \varphi_{st} - 0.1 \lg i_{ast}$, wherein φ_z -- value of the protective potential, φ_{st} -- steady potential of the metal, i_{ast} -- the RC at φ_{st} , expressed in units of current intensity. RC of the metal at φ_z is selected on the basis of the permissible corrosion losses of the protected structure (for example, in the case of steel the value of 10^{-4} g/dm² per day

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Corrosion. Protection from Corrosion.

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Abs Jour: Referat Zhur - Khimiya, No 1, 1958, 1588

is taken). On the basis of the experimentally secured values of i_{act} and ϕ^{st} the protective potentials were calculated for Cu , Zn , Cd , Mg , Pb , Fe , cast iron in 1.5% solution of NaCl and for Fe in synthetic lake water (0.012% NaCl). The agreement between experimental and calculated data was found to be satisfactory. The proposed method of calculation can not be utilized when the following conditions occur: 1) passivation of metal takes place; 2) RC of the metal increases sharply due to alkalization of the area adjoining the electrode (for instance in the case of corrosion of Al); 3) in the process of anodic dissolution of metal the slower stage is the diffusion of the

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Corrosion. Protection from Corrosion.

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Abs Jour: Referat Zhur - Khimiya, No 1, 1958, 1588

metal ions from the electrode; 4) in the case of
other departures from the exponential correlation
between RC and potential of the metal.

Card 4/4

GERASIMOV, V.V.; ROZENFEL'D, I.L.

Effect of temperature on the rate of corrosion in metals.

Izv. AN SSSR Otd. khim. nauk no.10:1166-1171 O '57. (MIRA 11:3)

1. Institut fizicheskoy khimii AN SSSR.

(Corrosion and anticorrosives)

GERASIMOV, V.V.

AUTHOR
TITLE

GERASIMOV, V.V.

32-6-14/54

Modelling of the Complete Monopolarized Local Corrosion Elements
By Means of Galvanic Pairs.

PERIODICAL

(Modelirovaniye polnost'yu zapolyarizovannogo mestnogo
korroziionnogo elementa pomoshch'yu galvanicheskikh par -russian)
Zavodskaya laboratoriya, 1957, Vol 23, Nr 6, pp 689-691 (U.S.S.R.)
Received 7/1957 Reviewed 8/1957

ABSTRACT

It is claimed in this paper that the method mentioned is widely used. The Soviet scientists Akimov, G.V., Tomashov, N.D., Rosenfeld, I.L. and others developed this method by stating a series of the most important rules, through the application of this method is connected with certain difficulties. The sensitive galvanometers possess high interior resistances, and their introduction into the circuit fundamentally modifies the work of the galvanic pairs. In this respect a "scheme with zero resistance" was worked out which, through permitting the elimination of the effect of the voltage decrease in the exterior circuit, nevertheless maintains the level of the interior resistance (electrolytic resistance which makes itself felt in the case of a separation of the anode- and cathode circuits. By a special arrangement, i.e. if anode and cathode are close to each other in a receptacle, conditions are produced which correspond to the completely monopolar system and thus permit the application of the described method.

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32-6-14/54

Modelling of the Complete Monopolarized Local Corrosion Elements
by means of Galvanic Pairs.

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8(2)

AUTHORS:

Gerasimov, V. V., Gromova, A. I.,
~~Savinin, A. A.~~

SOV/32-24-11-31/37

TITLE:

Autoclave for Electro-Chemical Investigations at High
Temperatures and Pressure
(Avtoklav dlya provedeniya elektrokhimicheskikh issledovaniy
pri vysokikh temperaturakh i davleniyakh)

PERIODICAL:

Zavodskaya Laboratoriya, 1958, Vol 24, Nr 11, pp 1420-1421
(USSR)

ABSTRACT:

So far there are no satisfactory methods of determining the electrochemical potential and of plotting polarization curves at temperatures of 300-350° and at a pressure of 100-200 atmospheres. In the literature autoclaves are described (Ref 1) for the polarization of samples, but the problem of measuring the potential was not dealt with. The problem is the determination of the potential of the comparison electrode in the autoclave in comparison to the standard electrode which is under normal pressure and at a normal temperature. V. A. Gavrilin developed an autoclave with an electrolytic key, which allows electrochemical determinations at high temperatures and pressure (Sketch). In order to avoid a contact

Card 1/2

Autoclave for Electro-Chemical Investigations at
High Temperatures and Pressure

SOV/32-24-11-31/37

of the electrolyte liquid of the key with the metal of the autoclave, the respective parts were made of "ftorplast" or "mikaleks". The electrolyte key is cooled with water, as these plastic materials can endure temperatures up to 200° only. Bonnemay (Bonme) (Ref 3) shows that the temperature gradient of the potential at the borders of identical solutions of different temperatures is very low, and, therefore, a respective error can be neglected. The autoclave is made of ~~1Kh18N9T~~ steel and has a capacity of 0.5 l. Cathode polarization curves for ~~1Kh18N9T~~ steel in distilled water are given. The apparatus can be used for investigations up to 350° and 200 atmospheres. There are 2 figures and 3 references.

Card 2/2

GERASIMOV, V.V.

~~Calculating the amount of protective current used.~~ Zhur. prikl.
khim. 31 no.7:1111-1114 J1 '58. (MIRA 11:9)
(Electric currents)

GERASIMOV, V.V.; GROMOVA, A.I.; SHAPOVALOV, E.T.

[Effect of oxygen on the corrosion and electrochemical
behavior of 1Kh18N9T steel] Vliianie kislороda na kor-
roziionnoe i elektrokhimicheskoe povedenie stali 1Kh18N9T.
Moskva, Glav.upr. po ispol'zovaniyu atomnoi energii, 1960. 5 p.
(MIRA 17:1)

(Steel—Corrosion)
(Water, Distilled—Oxygen content)

GERASIMOV, V.V.; GROMOVA, A.I.; SABININ, A.A.; SHAPOVALOV, E.T.

[Autoclave for electrochemical research] Avtoklav dlia
elektrokhimicheskikh issledovani. Moskva, Glav. upr.
po ispol'zovaniyu atomnoi energii, 1960. 8 p.
(MIRA 17:2)

GERASIMOV, V.V.; POPOVA, K.A.

[Investigating the mechanism of the corrosion cracking
of 1Kh18N9T austenitic stainless steel] Issledovanie me-
khanizma korrozionnogo rastreskivaniia austenitnoi ner-
zhaveliushchei stali 1Kh18N9T. Moskva, Glav. upr. po is-
pol'zovaniu atomnoi energii, 1960. 11 p.

(MIRA 17:1)

(Steel, Stainless--Corrosion)
(Electrolytic corrosion)

GERASIMOV, V.V.; GROMOVA, A.I.

00000000000000000000

[Effect of the composition of solutions on the anodic
behavior of steel] Vliianie sostava rastvora na anodnoe
povedenie stali. Moskva, Glav. upr. po ispol'zovaniu
atomnoi energii, 1960. 11 p. (MIRA 17:1)

GERASIMOV, V.V.; GROMOVA, A.I.

[Investigating the corrosion and the electrochemical
behavior of 12KhM steel in water at high temperatures]
Issledovanie korrozionnogo i elektrokhimicheskogo povede-
niia stali 12KhM v vode pri vysokoi temperature. Moskva,
Glav. upr. po ispol'zovaniu atomnoi energii, 1960. 14 p.
(MIRA 17:1)

(Steel—Corrosion)
(Metals, Effect of temperature on)

GERASIMOV, V.V.; ALEKSANDROVA, V.I.; GRONOVA, A.I.; POPOVA, K.A.;
SHAPOVALOV, E.T.

[Investigating the electrochemical and corrosion behavior
or 1Kh18N9T stainless steel in water of various composi-
tion] Issledovanie elektrokhimicheskogo i korroziionnogo
povedeniia nerzhaveiushchei stali 1Kh18N9T v vode razlich-
nogo sostava. Moskva, Glav.upr. po ispol'zovaniyu atomnoi
energii, 1960. 17 p. (MIRA 17:1)
(Steel, Stainless--Corrosion) (Electrochemistry)

PHASE I BOOK EXPLOITATION

SOV/5256

Gerasimov, Valentin Vladimirovich, ed., Candidate of Chemical Sciences.

Korroziya reaktornykh materialov; sbornik statey (Corrosion of Nuclear-Reactor Materials; a Collection of Articles) Moscow, Atomizdat, 1960.
284 p. 3,700 copies printed.

Ed.: A.I. Zavodchikova; Tech. Ed.: Ye.I. Mazel'.

PURPOSE: This collection of articles is intended for mechanical and metallurgical engineers as well as for scientific research workers concerned with the construction of nuclear reactors.

COVERAGE: The water corrosion of various types of stainless steel and alloys under high pressures and temperatures is investigated from the point of view of the use of these materials for the construction of nuclear reactors. Attention is given to the following: the use of oxygen for protecting steel against corrosion, the behavior of steel in high-temperature

Card 1/8

Corrosion of Nuclear- (Cont.)

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water with various compositions, factors of metal stress corrosion, intergranular corrosion, the mechanism of corrosion cracking, and the corrosion resistance of aluminum and zirconium alloys. Conclusions based on test results are included. No personalities are mentioned. Most of the articles are accompanied by references. Of 238 references 97 are Soviet.

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AND ELECTROCHEMICAL CORROSION AT
HIGH TEMPERATURES AND PRESSURES

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Card 9/9

VK/wrc/bc
10-12-61

18.8300

30641

S/081/61/000/020/045/089
B107/B101

AUTHORS: Gerasimov, V. V., Gromova, A. I., Shapovalov, E. T.

TITLE: Effect of oxygen on the corrosion behavior and the electro-chemical behavior of 1X18M9T (1Kh18N9T) steel

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 258, abstract 20I138 (Sb. "Korroziya reaktorn. materialov". M., Atomisdat, 1960, 49-52)

TEXT: The authors studied the anodic and cathodic processes during corrosion of 1X18M9T (1Kh18N9T) steel in distilled water at 300°C and 87 atm. The rate of anodic dissolution of the metal is accelerated with a shift of the potential to the positive side. Addition of 400 - 430 mg/liter of O₂ has no effect on the anodic process but increases the rate of the cathodic process (shifting the stationary potential of 1Kh18N9T and 5M-851 (EI-851) steels to the positive side). Corrosion remains uniform for all O₂ concentrations. [Abstracter's note: Complete translation.]

Card 1/1

30642

S/081/61/000/020/046/089
B107/B101

18.8300

AUTHORS: Moskvichev, G. S., Gerasimov, V. V.
TITLE: Effect of the composition of water on the anodic behavior
of aluminum
PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 259, abstract
201139 (Sb. "Korroziya reaktorn. materialov", M., Atomizdat,
1960, 64 - 68)

TEXT: The authors studied the kinetics of the anodic process at room
temperature on an aluminum alloy in solutions containing Cl^- , SO_4^{2-} , NO_3^- ,
 CO_3^{2-} , as well as a mixture of these ions. The range of the passive state
was found to be reduced by the presence of chloride ions in the solution .
It was shown that the formation of a range of overpassivation on aluminum
during anodic polarization was not due to a formation of metal compounds of
higher valency. [Abstracter's note: Complete translation.]

Card 1/1

S/081/61/000/020/049/089
B107/B101

AUTHORS: Gerasimov, V. Y., Aleksandrova, V. N., Gromova, A. I.,
Popova, K. A. Shapovalov, E. T.

TITLE: Study of the electrochemical behavior and the corrosion
behavior of 1X18N9T (1Kh18N9T) stainless steel in water of
different compositions

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 259, abstract
20I146 (Sb. "Korroziya reaktorn. materialov". M., Atomizdat,
1960, 52-63)

TEXT: The authors studied the kinetics of electrode processes of 1X18N9T
(1Kh18N9T) stainless steel in distilled water and in solutions of Na_2SO_3 ,
and Na_2SO_4 , HNO_3 , HCl and H_2SO_4 , NaOH , NaCl at room temperature and 300°C ,
and at 87 atm pressure. It was shown that in all media, except for 0.15 N HCl ,
the 1Kh18N9T steel was in a passive state at corresponding potential values;
in the solutions mentioned, the rate of dissolution was $0.016 - 0.020 \mu\text{a}/\text{cm}^2$.

Card 1/2

Study of the electrochemical behavior...

S/081/61/000/020/049/089
B107/B101

[Abstracter's note: Complete translation.]



Card 2/2

18.8300

28565 8/137/61/000/009/069/087
A060/A101

AUTHORS: Gerasimov, V. V., Popova, K. A.

TITLE: Investigation of the mechanism of corrosion cracking in steel
1X18H9T (1Kh18N9T)

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 9, 1961, 53, abstract 9I360
(V sb. "Korroziya reaktorn. materialov". Moscow, Atomizdat, 1960,
102-108)

TEXT: The investigation was carried out upon the mechanism of corrosion cracking and the kinetics of electrode processes in steel 1Kh18N9T used in nuclear power installations. The effect of mechanical stresses up to 33.3 kg/mm^2 was studied in distilled water, in 0.01 n. solution of Na_2SO_4 ; 0.001 n. HNO_3 ; 0.001 n. NaOH ; 0.01 n. NaCl . The plan of the installation for the electrochemical investigations of loaded specimens is given. Tensile stresses in stainless steel do not affect the rate of the cathode process and the rate of steel dissolution in the passive state in the NaCl solution, in contradistinction to other media investigated; the tensile stresses affect considerably the kinetics of the anode process, narrowing the region of the passive state and

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20565

S/137/61/000/009/069/087
A060/A101

Investigation of the mechanism ...

accelerating the rate of metal dissolution. An increase in the concentration of Cl^- in the solution acts upon the kinetics of the anode process analogously to an increase in the tensile stresses in the metal. On the basis of the electrochemical investigations, a mechanism of the corrosion cracking of steel 1Kh18N9T is proposed, and also methods of calculating the concentrations of O_2 and Cl in solution which are dangerous from the viewpoint of corrosion cracking.

Ye. Layner

[Abstracter's note: Complete translation]

Card 2/2

/8.8300

28314
S/081/61/000/016/022/040
B106/B101

AUTHORS: Gerasimov, V. V . Gromova. A. I., Shapovalov. E. T.
TITLE: Corrosive cracking of steel of the type 1X16H9T (1Kh16N9T)
PERIODICAL: Referativnyy zhurnal. Khimiya, no. 16 1961. 306. abstract
16M170 (Sb. "Korroziya reaktorn materialov" M., Atomizdat,
1960, 139-144)

TEXT: The study of the effect of the O_2 and Cl concentration on the
corrosive cracking of steel of the type 1X16H9T (1Kh16N9T) showed that at
a constant Cl content of 0.1 mg/liter the time until corrosive cracking
sets in increases if the O_2 content is reduced from 40 to 0.4 mg/liter.

[Abstracter's note: Complete translation.]

Card 1/1

18 8300

28568

S/137/61/000/009/074/087
A060/A101

AUTHORS: Gerasimov, V. V., Popova, K. A.

TITLE: Interocrystallite corrosion of steel 1X1849T (1Kh18N9T) in water and steam at high temperatures and pressures

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 9, 1961, 54, abstract 9I365 (V sb. "Korroziya reaktorn. materialov". Moscow, Atomizdat, 1960, 148-150)

TEXT: Tests were carried out on steel 1Kh18N9T in deaerated water at a temperature of 350°C and pressure 170 atm, as well as in deaerated steam at a temperature of 550°C, pressure of 200 atm with a soaking for 2,000 hours. In stainless steel of the type 1Kh18N9T having a tendency towards interocrystallite corrosion (according to GOST 6032 - 51), the latter does not develop in deaerated steam and water environment at temperatures up to 550°C.

Ya. Layner

[Abstracter's note: Complete translation]

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S/081/61/000/020/047/089
B107/B101

AUTHORS: Gerasimov, V. V., Gromova, A. I., Shapovalov, E. T.

TITLE: Study of the corrosion resistance of stainless steels in water vapor mixture at overcritical temperature and high pressures

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 259, abstract 201144(Sb. "Korrosiya reaktivn. materialov". M., Atomizdat, 1960, 185 - 190)

TEXT: The authors studied the corrosion resistance of stainless steels of the types 1X18H9T (1Kh18H9T), 3M-851 (EI-851), 3M-696 (EI-696) under overcritical conditions in strained and relieved state. They showed that corrosion of these steels was uniform in air-saturated water vapor mixture at 500 and 550°C, and that these steels had a quality KСЗ (KS 3) according to ГОСТ 5272-50 (ГОСТ 5272-50). It is pointed out that mechanical stresses increase the rate of general corrosion. The corrosion of EI-851 steel in relieved and strained state decreases with time; the presence of O₂ at

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Study of the corrosion resistance...

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550°C causes pitting corrosion. [Abstractor's note: Complete translation.]

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30643

18.8106

S/081/61/000/020/048/089
B107/B101

AUTHORS: Gerasimov, V. V., Gromova, A. I.

TITLE: Study of the corrosion behavior and the electrochemical behavior of 12XM (12KhM) steel in water at high temperature

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 259, abstract 201145 (Sb. "Korrosiya reaktorn. materialov". M., Atomisdat, 1960, 191-199)

TEXT: The corrosion of 12XM (12KhM) steel was found to be of electrochemical nature at high temperatures (about 330°C) and pressures (130 kg/cm²). The corrosion rate of the steel was shown to increase with increasing oxygen concentrations in water. Corrosion was uniform for 12KhM steel samples tested in distilled water saturated with hydrogen and with hydrazine addition. Pitting corrosion occurred in water saturated with oxygen and air. [Abstracter's note: Complete translation.] X

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5.7100
18.12.72

S/081/62/000/001/008/067
B156/B101

AUTHORS: Gerasimov, V. V., Aleksandrova, V. N.

TITLE: Investigation of the electrochemical behavior of zirconium

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 1, 1962, 84, abstract
1B260 (Sb. "Korroziya reaktorn. materialov". M., Atomizdat,
1960, 274-277)

TEXT: The behavior of Zr which has undergone various preliminary treatments (mechanical dressing, etching in a solution of 5 ml HF + 45 ml HNO₃ + 50 ml H₂O, and oxidation in the air of 350, 650 or 750°C) during cathodic and anodic polarization in solutions of 0.01 N NaCl, 0.01 N Na₂SO₄, 0.1 and 0.01 K NaF, 0.025 N HF, 0.01 N NaF + 0.05 N HNO₃, and in distilled water, was studied. The composition of the solution and the preliminary surface treatment do not affect the rate of cathodic reduction of O₂. The exception is the oxidation of Zr at 750°C, which greatly increases the overvoltage

Card 1/2

Investigation of the electrochemical ...

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B156/B101

of this reaction. In all the solutions except those containing HF, Zr is passivated during anodic polarization. If there is an oxide film, formed during the prolonged anodic polarization of Zr or during its oxidation in the air, at the surface, the passive state region is wider, and the rate of the anodic process in this region is lower. [Abstracter's note: Complete translation.]

X

Card 2/2

18.8300

77156

SOV/129-60-1-4/22

AUTHORS: Gerasimov, V. V. (Candidate of Technical Sciences),
Popova, K. A. (Engineer)

TITLE: Intercrystalline Corrosion of 1Kh18N9T-Steel in
Steam and Water Media

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
1960, Nr 1, pp 13-14 (USSR)

ABSTRACT: The authors investigated the susceptibility to corrosion
under the action of water and steam in 1Kh18N9T-steel.
Three types of specimens with the following composition
were tested: (1) C, 0.008; Si, 0.51; Mn, 1.19; Cr, 17.45;
Ni, 9.49; Ti, 0.7%. (2) C, 0.11; Si, 0.73; Mn, 1; Cr,
17.3; Ni, 9.61; Ti, 0.37%. (3) C, 0.16; Si, 0.75; Mn,
0.51; Cr, 17.3; Ni, 9.4; Ti, 0.65%. In State Standard
tests (GOST 6032-51) intercrystalline corrosion was not
observed in specimens of group (1) but appeared in
groups (2) and (3). In an attempt to prove that contrary
to State Standard test methods intercrystalline corrosion
does not necessarily develop in all media, the authors

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Intercrystalline Corrosion of 1Kh18N9T-Steel
in Steam and Water Media

77156
SOV/129-60-1-4/22

investigated austenitized and annealed (at 650° C for 2 hr) specimens as follows: (1) flat 30 x 8 x 1.5 mm specimens were exposed to steam in an autoclave for 1,000 hr at 350° C, $p = 170 \text{ kg/cm}^2$; (2) tubular 200 mm long welded specimens with 15 x 2.5 mm diameter were held in distilled water at 350° C for 500, 1,000, and 2,000 hr, $p = 160 \text{ kg/cm}^2$, and 550° C, $p = 200 \text{ kg/cm}^2$. Stress in metal: 4 to 4.7 kg/mm^2 . A dense oxide film developed on all specimens. Bending by 90° C failed to produce cracking. Intercrystalline corrosion was not observed. The authors believe that grain boundaries dechromized in water and steam are in a state of passivity; this assumption is corroborated by the work of D. I. Depaul, "Corrosion," 13, Nr 1, 1957. There is 1 table; and 1 U.S. reference as given in text.

Card 2/2

GERASIMOV, V.V., kand.khim.nauk; GROMOVA, A.I., inzh.

Investigating the corrosion resistance of 12KhM steel in
distilled water at a temperature of 330° C and a pressure
of 130 kg/cm². Teploenergetika no.4:42-47 Ap '60.
(MIRA 13:8)

(Steel--Corrosion)

GERASIMOV, V.V.; GROMOVA, A.I.

Effect of the solvent composition on the anodic behavior of
low-carbon steel. Zhur.prikl.khim. 33 no.7:1563-1567
Jl '60. (MIRA 13:7)
(Steel--Corrosion)

GERASIMOV, V.V.; GROMOVA, A.I.; SHAPOVALOV, E.T.; SHATSKAYA,
O.A.

[Development of the method of electrochemical measurements at a temperature up to 300°C and pressure up to 100 kg/cm^2] Razrabotka metodiki elektrokhimicheskikh izmerenii pri temperature do 300°C i davlenii do 100 kg/cm^2 .
Moskva, Gos.kom-t po ispol'zovaniu atomnoi energii, 1961.
20 p. (MIRA 17:1)

188300

26574
S/129/61/000/008/007/015
E111/E335

AUTHOR: Gerasimov, V.V., Candidate of Chemical Sciences

TITLE: Stress Corrosion Cracking of Austenitic-type
1x18H9T (1Kh18N9T) Steel

PERIODICAL: Metallovedeniye i termicheskaya obrabotka
metallov, 1961, No. 8, pp. 29-30, 35-36

TEXT: Austenitic stainless steels are subject to stress corrosion in various media. In the present work the author examines the stress-corrosion mechanism of type 1Kh18N9T steel in a chloride solution when this corrosion is due to the occurrence of structural changes in the austenite under the influence of deformation and mechanical stresses

(Ref. 1 - G.J. Horwood - Corrosion, 6, 9, 290, 1952;
Ref. 2 - C. Edeleanu - Journal Iron and Steel Institute, 173, 2, 140, 1953; 184, 2, 166, 1956; Ref. 3 - T.R. Hoar, J.C. Hines - Journal Iron and Steel Institute, 182, 2, 124, 1956). It has been shown (Ref. 2) that cracks spread along alpha-phase formations. The corrosion of 1Kh18N9T steel occurs in accordance with the following process: changes in

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Stress Corrosion Cracking

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local stress fields through rearrangement of the lattice during movement of dislocations can lead to stress concentrations and these to austenite transformation to form the alpha phase. In the presence of chlorides this alpha phase dissolves rapidly, producing more stress concentrations and the process develops autocatalytically. Both presence of alpha phase and tensile stress reduce the breakdown potential. It is pointed out that the latter does not change the anode-process kinetics in austenitic stainless steel in the active state in chloride-containing solutions. Extension up to 30% produces little alpha phase in austenitic stainless steel with 12% Ni; the higher the extension the less stable the austenite (Ref. 4 - Special Steel, Vol. 1, 1959 - A.V. Ryabchenkov). At extensions up to 3-5 %, the quantity of alpha-phase in steels with 9-10% Ni is of the same order as in the 12%-Ni steel. Magnetic evidence suggests that the amount of ferrite appearing through deformation of the austenitic steel approaches that in ferritic chromium steel. At extensions of over 3-5%, the resistance of 8-10%^{Ni} austenitic steel to stress corrosion approaches that of ferritic steels; however, if deformation of the steel is

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effected at temperatures not leading to alphas-phase formation
no change will occur in the resistance to stress corrosion.

In 18-8 steels stressed to 31 kg/mm^2 , preliminary deformation
of 8% accelerates appreciably stress corrosion. The author
draws attention to the fact that there is little point in
trying to find the critical stress below which stress corrosion
does not occur, since external stress is not the only factor.
The stress-corrosion resistance criterion is stability of the
austenite (resistance increases with stability). Since ferrite
is not passivated in chlorides, stress corrosion of austenitic
steels intensifies with rising chloride concentration in the
solution. Ferrite is passivated in sulphate solutions;
therefore in such solutions (as in nitrate solutions) there
is no stress corrosion of 1Kh18N9T steel. The rate of the
cathodic reaction (oxygen-ionization) on austenite and ferrite
is not affected by stress in chlorides, sulphates, carbonates
or nitrates; the rate decreases with decreasing oxygen
concentration and this will result in an increase of the
resistance to stress corrosion of austenitic stainless steels.
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X

Stress Corrosion Cracking

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E111/E335

Cathodic polarization acts similarly; anodic has only a slight accelerating effect. Variations in pH in the range 4-8 in chloride-containing solutions practically do not change the rate of solution of ferrite or the resistance to stress corrosion. The author concludes that to prevent stress corrosion under the conditions discussed the medium should be treated in such a way that either the rate of solution of active-state ferrite is reduced or the ferrite is passivated. High-austenite stability and avoidance of fabrication is important and service conditions producing alpha phase should also be avoided.

There are 2 figures and 13 references: 4 Soviet and 9 non-Soviet. The four latest English-language references quoted are: Ref. 2 - Edeleanu, C. - Journal Iron and Steel Institute (quoted in text); Ref. 3 - quoted in text; Ref. 8 - H. Uhlig, A. White - Acta Metallurgia, Vol. 5, No. 8, 1957; Ref. 9 - H. Uhlig, J. Lincoln - Journal Electrochem. Soc. Vol. 105, No. 6, 1958.

Card 4/4

89360

S/089/61/010/002/010/018
B102/B209

18.1130

AUTHORS: Gerasimov, V. V., Aleksandrova, V. N.

TITLE: The effect of radiation on the electrochemical behavior of
steel of the type 1X18H9T (1Kh18N9T)

PERIODICAL: Atomnaya energiya, v. 10, no. 2, 1961, 164-166

TEXT: This is a report of investigations on the electrochemical behavior of steel of the type 1Kh18N9T under irradiation by thermal neutrons. The studies were made with a electrolytic glass cell (400 mm long, diameter 20 mm, wall thickness about 1 mm) shown in Fig. 1. In the upper part of the cell, a calomel electrode and an electrolytic switch are located. The steel samples were 1 x 10 x 235 mm large and had the following composition (in % by weight): 0.07 C, 1.23 Mn, 19.1 Cr, 10.5 Ni, 0.53 Ti. The specimen potential was compared with the potential of the saturated calomel electrode; at maximum distance of the specimen from the switch the potential was lower by only 0.015 v than at minimum distance and, moreover, was practically independent of the length of the sample. A 1 mm thick steel wire (of the same type) which was isolated from the test sample by a glass pipe was used as an auxil-

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S/089/61/010/002/010/018
B102/B209

The effect of radiation ...

iary sample. The investigations were made in 0.01 N sodium-sulfate solution and in 0.01 N NaCl solution (about 20 ml). M-82 (M-82) and M-91 (M-91) milliammeters served for the current measurements, a ПЛ-5 (Pl-5) potentiometer for potential measurements. BAC-80 (BAS-80) storage batteries served as current supply. The cell was irradiated by thermal neutrons (10^{12} n/cm²-sec, 80-90°C) in reactor core. Every experiment was carried out twice and, for comparison, was repeated in a thermostat (85°C) without irradiation. The following were the results: The stationary potential of the beam in volts with respect to a hydrogen standard electrode

medium	not irradiated		irradiated	
	a	b	a	b
0.01 N Na ₂ SO ₄ solution	0.133	0.318	0.403	0.673
0.01 N NaCl solution	0.083	0.243	0.503	0.538

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B102/B209

The effect of radiation ...

a) before polarization b) three hours after polarization

The kinetics of the electrode processes were investigated potentiostatically (measurement of current, potential, and temperature every 10 minutes), the current was assumed to be steady if it did not change within one hour in the case of given potential. The determination of anode and cathode polarization of the steel specimen in sodium-sulfate and sodium-chloride solutions resulted in the following: Irradiation does not affect the kinetics of the anodic process in sodium-sulfate solution. Also in sodium-chloride solution, the character of the anode polarization curves is maintained on irradiation as well as the rate of the anodic polarization process in the passive range. However, the breakdown voltage and that portion on the anodic polarization curve which corresponds to the trans-passivation range is shifted by 100 to 150 mv towards positive. Those portions of the cathodic polarization curves which correspond to oxygen ionization were shifted towards positive on irradiation in both solutions, i. e. the rate of the cathodic process rose. This, of course, entails a shift of the stationary potential of the steel into the positive direction thus reducing the passive region. If the passive-state region is very small (e. g. in chlorides),

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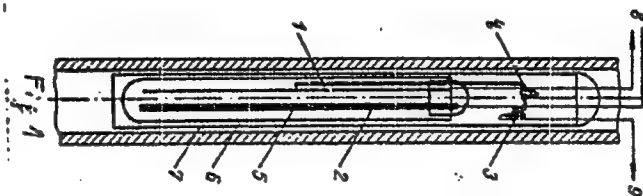
S/089/61/010/002/010/018
B102/B209

The effect of radiation ...

then as a consequence of the acting radiation the steel may get into the trans-passivation region, i. e. corrosion increases. There are 3 figures and 1 table.

SUBMITTED: September 1, 1960

Legend to Figure 1: 1) Sample;
2) auxiliary electrode;
3) calomel electrode;
4) electrolytic switch;
5) tube; 6) ampoule; 7) jacket;
8) to the circuit; 9) to the
potentiometer.



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30798

S/080/61/034/011/011/020
D243/D301

AUTHORS: Gerasimov, V.V., Gromova, A.I., and Shapovalov, E.T.

TITLE: The corrosion behavior of zirconium in distilled water at 85°C

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 11, 1961,
2473 - 2477

TEXT: The authors studied the corrosion resistance of zirconium (1) in distilled water at 85°C and (2) in contact with 1X18H9T (1Kh18N9T) steel and AlM aluminum, in distilled water at 85°C. Three types, A (greatest impurity), B, C (least impurity) of zirconium, containing up to 5 % impurity, were used in the tests. The samples were suspended on glass hooks in glass vessels in a thermostat after being previously treated to remove surface impurities. Contact was achieved as shown in Fig. 1. Corrosion resistance was estimated visually and by weight loss. The maximum weight loss was shown by samples of A after 100 hours (0.815 g/m²), equivalent to a corrosion rate of 0.008 g/m². Under these conditions therefore,

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S/080/61/034/011/011/020

The corrosion behavior of zirconium ... D243/D301

zirconium may be considered highly resistant. On a 1000 hour test it is considered completely resistant. Contact with stainless steel and aluminum alters the kinetics of corrosion, but leads to no increase in the rate. A 1 m gap between the contacting surfaces causes no change in behavior. The high corrosion resistance depends on zirconium passivity in these conditions. There are 6 figures, 2 tables and 2 Soviet-bloc references. X

SUBMITTED: November 28, 1960

Card 2/12

S/076/61/035/006/010/013
B127/B203

AUTHORS: Gerasimov, V. V., Gromova, A. I., Sabinin, A. A., and
Shapovalov, E. T.

TITLE: Autoclave for electrochemical investigations at high
temperatures and pressures

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 6, 1961, 1359-1361

TEXT: The authors describe an autoclave to which the reference electrode is attached outside and is kept at room temperature. An electrolytic cell establishes the contact with the solution in the autoclave. It must also endure the higher temperatures in the autoclave. A thermodiffusion potential results from the temperature gradient in the cell, which has to be taken into account. Since glass and quartz are dissolved, metal is used for the cell. Fig. 1 shows the measuring arrangement in a simulated representation. Due to earthing of the potentiometer 10, the electrode potential behaves just as in a glass cell. An essential shortcoming of the autoclave of Fig. 2 is that the cathodic and anodic curves of experiments in distilled water are only dependable for those curve sections

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Autoclave for electrochemical...

S/076/61/035/006/010/013
B127/B203

where the current density does not exceed $70 \mu\text{a}/\text{cm}^2$. In the autoclave construction of Fig. 3, the anodic and cathodic spaces are divided. This shifts the major part of the potential drop between the electrodes into the electrolytic cell. Therefore, the residual drop in the vacuum (containing the specimen to be tested) is small and negligible. This also applies to the thermodiffusion potential formed due to the temperature increase in the cell. At the boundary of similar solutions of different temperatures, the value was only about 10^{-6} v/deg. There are 3 figures and 1 non-Soviet-bloc reference. The reference to the English-language publication reads as follows: M. Bonnezay, Proc. meeting international committee of electrochemical thermodynamics and kinetics, 1954, London, 1955, 68.

SUBMITTED: October 16, 1958

Card 2/5

GERSHENOV, V. V.

GERSHENOV, V. V., [In 1957 at the Institute of Physical Chemistry, Academy of Sciences USSR] - "Some aspects of the theory of corrosion of reactor materials in critical-parameter water" (Session 2)

LYASHENKO, V. S., and others [Names of co-authors are not given. LYASHENKO is deceased, as of August 1961. He was at the Physics-Energetic Institute, National Committee of Utilization of Atomic Energy] - "Resistance to corrosion of austenitic and ferro-perlitic steels in a stream of liquid sodium at temperatures of 600°C and 700°C" (Session 4)

LYASHENKO, V. S., and NEVZOROV, B. A. [NEVZOROV's affiliation is not known to this office; he may possibly be at the Physics-Energetic Institute mentioned above] - "The mechanism of carbon transfer in liquid sodium" (Session 7)

NEVZOROV, B. A. - "The nature of oxygen in liquid sodium" (Session 7)

ROZENFELD, I. L., Institute of Physical Chemistry, Academy of Sciences USSR [1960 position], and others - "The effect of composition of water on corrosion of zirconium alloys at high temperatures and pressures"

Report to be submitted for the Intl. Conference on Corrosion of Reactor Materials (IAEA), Salzburg, Austria, 4-9 June 1962.

S/129/62/000/002/012/014
E073/E335

AUTHORS: Gerasimov, V.V., Candidate of Chemical Sciences
and Aleksandrova, V.N., Engineer

TITLE: Intercrystallite corrosion of steel type 1X18H9T
(1Kh18N9T) in distilled water

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov.
no. 2, 1962, 53

TEXT: The intercrystallite corrosion of the steels 1Kh18N9T
and 1X18H9 (1Kh18N9) was investigated at various temperatures
in distilled water with various oxygen contents. After the
corrosion tests the specimens were used for making polished
sections for metallographic investigations. The results, which
are tabulated in the paper, lead to the following conclusions:
1) neither of the two steels tends to develop intercrystallite
corrosion in river water or in distilled water at 100 °C with
free access to oxygen;
2) both steels are prone to develop intercrystallite corrosion
in the temperature range 950 - 200 °C [Abstracter's note: the

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Intercrystallite corrosion

S/129/62/000/002/012/014
E073/E335

figure given in the table, i.e. 350 °C at a pressure of 200 kg/cm², appears to be the correct figure and not the figure of 950 °C given in the text] in distilled water containing Cl ions and 0.2 - 1 mg/litre O₂; the depth of penetration of the intercrystallite corrosion is 1 - 2 grains in 2 000 hours; 3) the steel 1Kh18N9T is resistant to intercrystallite corrosion in oxygen-free distilled water and steam at temperatures of 350 and 550 °C. There is 1 table.

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181130

39744
S/129/62/000/008/001/003
E073/E535

AUTHORS: ~~Gerasimov, V.V.~~, Candidate of Chemical Sciences and
Aleksandrova, V.N., Engineer

TITLE: Corrosion resistance of type 2X15 (2Kh13), X17 (Kh17)
and X18 (Kh18) chromium steels

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
no.8, 1962, 36-40

TEXT: The authors have studied the effect of heat treatment on the corrosion resistance in sodium sulphate and chloride solutions of three chromium steels which are considered as possible replacements for type 1X18 QT (1Kh18N9T) stainless steel, using a potentiostatic method. The anodic-solution process was found to depend especially on chlorine-ion concentration. There is no passive range if the chlorine-ion concentration is 0.01 N and over in the case of the steel 2Kh13 and over a fewmg/litre in the case of the steels Kh17 and Kh18. Compositions: 2Kh13 - 0.21% C, 0.31% Si, 0.33% Mn, 13% Cr and 0.41% Ni; Kh17 - 0.14% C, 0.4% Si, 0.4% Mn, 17.8% Cr, <0.28% Ni; Kh18 - 0.9% C, 0.79% Si, 0.4% Mn, 19.0% Cr, <0.28% Ni. The kinetics of the anodic process depends

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Corrosion resistance of ...

S/129/62/006/008/061/003
E073/E535

on the condition of the steels. The steel Kh17 has a wide passive range (0.8 volt) after annealing at 760-780°C but the passive range is unstable after quenching and annealing. The Kh18 steel does not passivate in the annealed state but quenched with anodic polarization it has a passive range only in 0.01 N solutions of Na_2SO_4 with under 0.05 mg/litre chlorine-ion content. Generally, the tested chromium steels showed low corrosion resistance in solutions containing chlorine ions; Kh18, annealed at 150°C after hardening, had the highest corrosion resistance. In distilled water this steel had the highest corrosion resistance after annealing at 760-780°C. Conclusion: The tested steels are suitable as a substitute for the steel 1Kh18N9T only for operation in distilled water or in sodium sulphate solutions which are free from chlorine ions. There are 4 figures and 3 tables.

Card 2/2

GERASIMOV, V.V., doktortekhn.nauk; MOSKVICHEV, G.S., inzh.

Control of corrosion craching of austenite steel in water containing
Chlorides. Teploenergetika 9 no.11:67-68 N '62. (MIRA 15:10)
(Steel, Stainless—Corrosion)

AFOL'ZIN, Pavel Alekseyevich; GUL'YAYEV, Viktor Nikolayevich;
GERASIMOV, V.V., red.; BUL'DYAYEV, N.A., tekhn. red.

[Corrosion cracking of austenitic steels in heat power
engineering equipment] Korroziionnoe rastreskivanie au-
stenitnykh stalei v teploenergeticheskom oborudovanii.
Moskva, Gosenergoizdat, 1963. 270 p. (MIRA 16:10)
(Steel, Heat resistant--Corrosion)
(Thermal stresses)

AM4016089

BOOK EXPLOITATION

S/

Akol'zin, Pavel Alekseyevich (Doctor of Technical Sciences), Gerasimov, Vladimir Vladimirovich (Doctor of Technical Sciences)

Corrosion of structural materials of nuclear and thermal power plants (Korroziya konstruktsionnykh materialov yadernykh i teplovykh energeticheskikh ustanovok), Moscow, "Vysshaya shkola", 1963, 373 p., illus., biblio., 2.500 copies printed.

TOPIC TAGS: corrosion, nuclear power plant, thermal power plant, carbon steel, steam generator, steam boiler, low alloy steel, steel EI 257, steel 2Kh13, steel Kh17, 1Kh18N9T, electrochemistry

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SUB CODE: ML, CH, NS

SUBMITTED: 7 Mar 63

NR REF SOV: 124

OTHER: 234

DATE ACQ: 23 Jan 64

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AM.036546

BOOK EXPLOITATION

S/

Gerasimov, V. V.; Gromova, A. I.; Golovina, YE. S.; Moskvichev, G. S.;
Pavlova, F. S.; Smirnov, V. V.; Shapovalov, E. T.

Corrosion and irradiation (Korroziya i oblucheniye), Moscow, Gosatomizdat, 1963,
267 p. illus., biblio. 3,000 copies printed.

TOPIC TAGS: corrosion, irradiation, nuclear reactor, nuclear reactor material,
metallurgy, stainless steel, chromium steel, carbon steel, low alloy steel,
aluminum alloy, protective coating, electrochemical behavior

PURPOSE AND COVERAGE: The basis of this monograph was the research conducted by
the authors in recent years that has been published in the periodical literature
and the work of Soviet and foreign authors on the problems of the corrosion resis-
tance of structural materials. The monograph consists of ten chapters in which
corrosion and the protection of structural materials used in reactors, the inter-
action of radiation of the nuclear reactor with a substance and the effect of radia-
tion on the corrosion and electrochemical behavior of metals are examined. The
general and systematized material on the corrosion resistance of metals used in
reactors will be useful to a wide circle of designers, researchers, and engineers

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AM4036546

concerned with problems of reactor construction. Chapters I, VII, IX, and X were written by V. V. Gerasimov, Chapters II, IV -- E. T. Shapovalov, Chapter III -- A. I. Gromova, Chapter V -- V. V. Smirnov, Chapter VI -- G. S. Moskvichev, Chapter VIII -- F. S. Pavlova and Ye. S. Golovina. The authors express their gratitude to I. Ye. Zimakov for assistance in writing Chapter IX and their associates who participated in the research.

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AM036526

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SUB CODE: ML, NS

SUBMITTED: 14Mar63 NR REF SOV:0179

OTHER: 308

DATE ACQ: 07May64

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GERASIMOV, V.V.; ALEKSANDROVA, V.N.

Intergranular corrosion of weld joints in stainless steel.

Metalloved. 1 term. obr. met. no.5:60 My '63. (MIRA 16:5)

(Steel, Stainless--Welding)
(Corrosion and anticorrosives)

GERASIMOV, V. V., doktor tekhn. nauk; GROMOVA, A. I., inzh.;
SABININ, A. A., inzh.

Corrosion resistance of chromium steel in water and steam with
critical parameters. Teploenergetika 10 no.3:22-25 Mr '63.
(MIRA 16:4)

(Steel—Corrosion)

GERASIMOV, V.V., GROMOVA, A.I.; SHAPOVALOV, S.T.

Autoclave for chemical and corrosion tests at high temperatures
and pressures. Zav. lab. 30 no. 1:110-111 1964. (MIRA 17:9)

GERASIMOV, V.V.; MOSKVICHEV, G.S.

Passivity of metals. Zhur.prikl.khim. 37 no.1:109-118 Ja '64.
(MIRA 17:2)

GROMOVA, A.I.; MOROZOVA, I.E.; SERBACHOV, V.I.

Effect of the radiation of thermal neutron reactors on the potential
of mercury oxide electrodes. *Sashon.net.* 1 no. 1965. 21-45. '65.
(MIRA 18:2)

L 11979-66 EAT(n)/EWA(d)/EWP(t)/EWP(z)/EWP(b) IJP(c) MJW/JD/WW/JW/WB
 REG NR: APG001803 (N) SOURCE CODE: UR/0089/65/019/006/0546/0549
 AUTHOR: Belous, V. N.; Gromova, A. I.; Shapovalov, E. T.; Gerasimov, V. V.
 ORG: none
 TITLE: Corrosion resistance of construction materials in boron-containing solutions
 SOURCE: Atomnaya energiya, v. 19, no. 6, 1965, 546-549
 TOPIC TAGS: corrosion rate, boron compound, nuclear reactor material, nuclear reactor shield
 ABSTRACT: Since boron has a large cross section for thermal neutron capture, boron-containing solutions are used for neutron shielding and reactor control. The use of aqueous solutions of boron, however, raises the question of corrosion resistance to such solutions of various construction materials. The authors carried out corrosion tests up to 1000 in solutions of boric acid, sodium tetraborate, and ammonium tetraborate. Tabulated data are presented showing 1) the characteristics of the original solutions at room temperature; 2) the rate of corrosion in the 20-100C temperature range for periods of 100 - 500 hr of OKh18N10T steel, VT-1-2 alloy (Ti), AMg-5 alloy (Al), S-1 lead, and steel 20 in deaerated and air-saturated boron-containing solutions; 3) the ratio of the amount of metal going into the solution to the
 Card 1/2

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ACC NR: AP6001803

amount of metal lost due to corrosion; and 4) the rate of corrosion of these materials in boric acid at 1000 for a period of 100 hr. Orig. art. has: 4 tables.

SUB CODE: 11, 18 / SUBM DATE: 17Mar65 / ORIG REF: 001 / OTH REF: 006

Card 2/2 *print*

UDC: 620.193.4: 621.039.546

L 06983-67 EWT(m)/EMP(t)/ETI IJF(c) JD/WB/GG

ACC NR: AP6018359

(N)

SOURCE CODE: UR/0089/66/020/005/0435/0436

AUTHOR: Vasina, V. N.; Aleksandrova, V. N.; Gerasimov, V. V.

ORG: none

TITLE: Influence of gamma radiation on the process of scale formation

SOURCE: Atomnaya energiya, v. 20, no. 5, 1966, 435-436

TOPIC TAGS: gamma radiation, metal scaling, corrosion, stainless steel

ABSTRACT: In view of the lack of published data on the influence of mechanical, thermodynamic, and chemical factors on the formation of scale and the corrosion of cladding of fuel elements, the authors present the results of a study of the simultaneous heat flux and γ irradiation on scale formation. The study was made in a setup (Fig. 1) consisting of a stainless steel bath filled with an aqueous solution, in which the sample is placed. The sample is heated by electric current, the scale is produced by calcium sulfate in the water, and the γ radiation was obtained from a Co^{60} source (2 gram equivalent of radium). The scaling tests were made with and without the γ irradiation. The results show that for equal heating and for equal solution parameters, the rate of scale formation increases when the sample is exposed to γ rays. Furthermore, the scale produced under the influence of γ rays contains, in addition to the calcium sulfate deposit, also the products of corrosion of stainless

Card 1/2

UDC: 621.039.544.5

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ACC NR: AP6018359

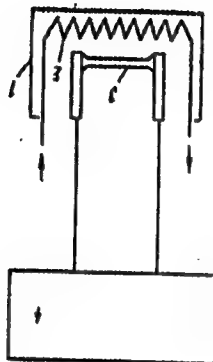


Fig. 1 Diagram of setup. 1 -- Bath, 2 -- refrigerator,
3 -- sample of stainless steel (1Kh18N9T); 4 -- control
block

steel. Orig. art. has: 4 figures

SUB CODE: 18, 20 / SUBM DATE: 29 Nov 65 / ORIG REF: 003 / OTH REF: 002

Card 2/2 *hch*

AID P - 2651

Lyak
Subject : USSR/Aeronautics
Card 1/1 Pub. 135 - 6/17
Author : Zveryev, B., Col. and Gerasimov, V., Maj.
Title : Bombing in complicated weather conditions
Periodical : Vest. vozd. flota, 9, 34-40, S 1955
Abstract : A detailed description of how experienced crews of modern aircraft prepare and execute bombing training missions in complicated weather conditions. Several examples are given, and some names are mentioned. Diagrams.
Institution : None
Submitted : No date

Gerasimov, V. Ya

AID P - 5328

Subject : USSR/Aeronautics - bombing

Card 1/1 Pub. 135 - 7/24

Author : Gerasimov, V. Ya., Maj., Mil. navigator class I

Title : How we improve bombing accuracy

Periodical : Vest. vozd. flota, 12, 30-37, D 1956

Abstract : How to improve the bombing accuracy by determining with adequate accuracy the errors in calculations of geodetic data is described in this article. One photo, 6 diagrams, 1 graph, 2 tables. The article merits attention.

Institution : None

Submitted : No date

BEME, Yevgeniy Leonidovich; VINOKUROV, Aleksey Konstantinovich;
GERASIMOV, Vadim Yakovlevich; MOLOZOV, Vladimir Nikolayevich;
PLOKHOV, Sergey Grigor'yevich; LOPUKHOV, Mikhail Grigor'yevich;
SUDAKOV, Vladimir Stepanovich; SAVICH, M.P., red.; KAGIBIN,
P.A., tekhn. red.

[Driver's manual] Spravochnik shofera. Sost. E.L. Beme i dr.
Alma-Ata, Kazakhskoe gos. izd-vo, 1961. 439 p. (MIRA 15:6)
(Motor vehicles--Handbooks, manuals, etc.)
(Transportation, Automotive--Handbooks, manuals, etc.)

GERASIMOV, V.Ye., tekhnik; TITOV, N.M., tekhnik

Repair of a compressor drive. Energetik 9 no.6:7-8 Je '61.

(MIRA 16:7)

(Compressors—Electric driving)

GERASIMOV, V.Ye., tekhnik

Device for removing and placing terminal shields on ATM.200 electric
motors. Energetik 9 no.7:23-24 J1 '61. (MIRA 14:9)
(Electric motors--Maintenance and repair)

GERASIMOV, V.Ye., tekhnik

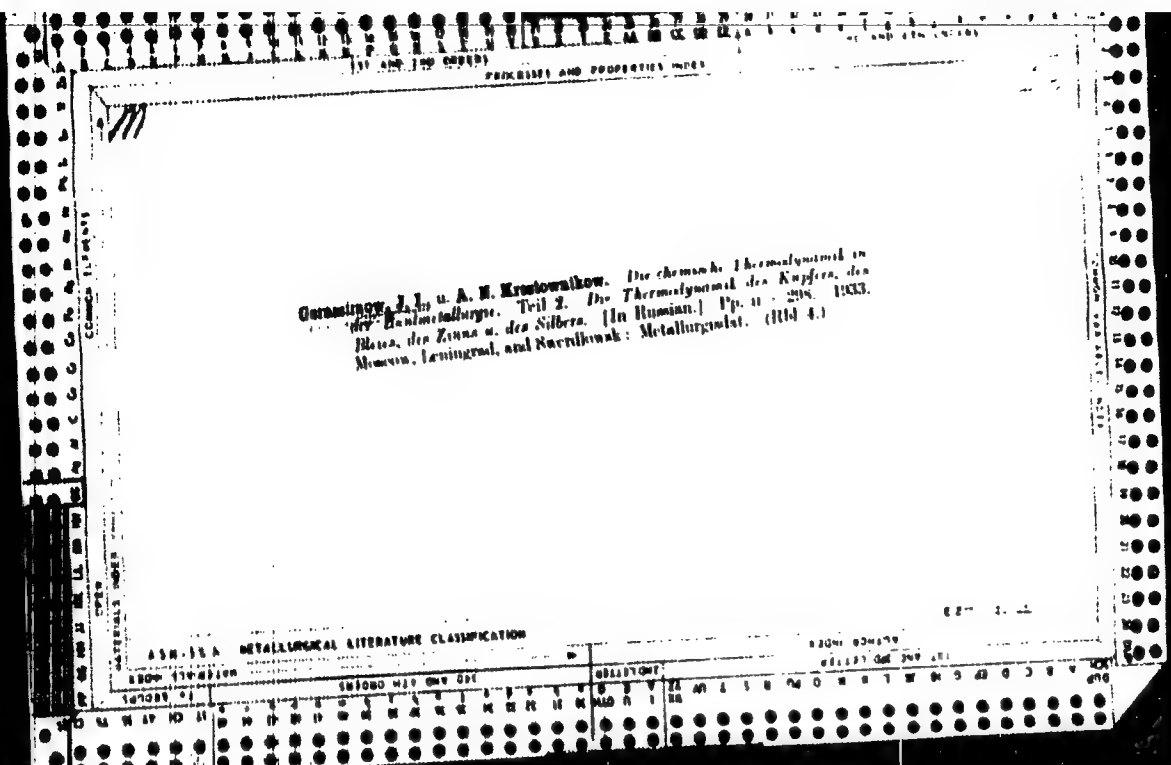
Machine for centrifugal babbitt filling of bearing bushings of
electric motors. Energetik 11 no. 12:16-17 D '63.

(MIRA 17:5)

GERASIMOV, V.Ye., teknik

Use of a hydraulic technique for cleaning underground ventilation
channels. *Energetik* 12 no.1:17-18 Ja '64. (MIRA 17:3)

<p>GERASIMOV, Ya. A.</p> <p>CP</p>		<p>2</p>	
<p>Chemical thermodynamics and molecular spectra. Ya. A. Gerasimov. <i>Uspekhi Khim.</i> 2, 475-52 (1953). - Theoretical and review. Entropies as calcd. by the third law and compared with those given by spectroscopic data for many substances. P. H. Rathmann</p>			
<p>A 54.614 METALLURGICAL LITERATURE CLASSIFICATION</p>			
<p>15000 11101100</p>			
<p>15000 11101100</p>			



1ST AND 4TH EXPERT									
PROCESSES AND PROPERTIES INDEX									
<p>77</p> <p>Gerasimov, J. I. and A. E. Krestovnikov. <i>Chemical Thermodynamics in the Metallurgy of Non-Ferrous Metals. Volume 3. The Thermodynamics of Aluminium, Antimony, Magnesium, Mercury, Nickel, Arsenic, Bismuth, and Cadmium.</i> [In Russian.] Pp. 342. 1934. Moscow, Leningrad, and Sverdlovsk: Gos. nauch.-techn. izd. po tsvetnoi metallurgii. (Rbl. 4.50.)</p>									
<p>ASB.SLA METALLURGICAL LITERATURE CLASSIFICATION</p>									
<p>10000 111 011 001</p>									
<p>10000 111 011 001</p>									

R

Solubility of vanadium chromate in water.
J. I. Gerasimov (J. Gen. Chem. Russ., 1934, 4, 721—
722).—Solubility data are given for the range 0–75°.
R. T.

ASSEMBLED METALLURGICAL LITERATURE CLASSIFICATION
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The image shows a microfilm frame containing a document page. The page has a perforated border on all sides. At the top center, there is a header "PROCESSES AND PROCEDURES". In the upper left corner, there is a handwritten "Co". In the upper right corner, there is a handwritten "7". The main body of the document contains a paragraph of text:

Evaluation of activity of metals in melts from the equilibrium coefficient. V. I. Gerasimov. See Repts. Moscow State Univ. 1930; vol. 6, no. 13, p. 107. The product obtained by heating excess of Bi with S at 510° is shown, on theoretical grounds, to contain BiS₂. A method is described whereby the activity of a metal dissolved in its fused salt is evaluated from the equl. coeff. H. C. A.

In the bottom left corner, there is a vertical label "METALLURGICAL LITERATURE CLASSIFICATION". Below it, there is a horizontal label "ASB-SEA METALLURGICAL LITERATURE CLASSIFICATION". To the right of this label, there is a small table with two columns: "CLASSIFICATION" and "NUMBER". The table contains several rows of numbers and letters.

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Ch

Thermal dissociation of the highest tin sulfides. Ya. I. Gerasimov, E. V. Kruglova and N. D. Rozenblum. *J. Gen. Chem.* (U. S. S. R.) 7, 1520-4 (1937). The dissociation pressure of SnS_2 in the interval 600-700° was detd. by the static method described previously (U. S. S. R., 1937). Above 650° the decomposn. product is SnS , which decomposes on further heating into lower sulfides. Preliminary expts. at 800-900° indicate the probable existence of Sn_2S_3 . Heats of dissociation in cal. per mol. of S_8 were detd. for the following reactions: $3\text{SnS}_2 = \text{Sn}_2\text{S}_3 + 3/2 \text{S}_8$; 21,700 for $2\text{SnS}_2 = \text{SnS} + 3/2 \text{S}_8$; and 21,900-22,700 for $\text{Sn}_2\text{S}_3 = 4\text{SnS} + 1/2 \text{S}_8$. S. I. Madorsky

GERASIMOV, Ya. I., ORENIKHINA, I. V.

"On the Synthesis and Analysis of Vanadium Sulfides," Zhur. Obshch. Khim., 9, No. 6, 1939. Laboratory of Chemical Thermodynamics, Moscow State University. Received 2 July 1938

Report U-1517, 22 Oct 1951

GERASIMOV, Ya. I.

600

1. GERASIMOV, Ya. I.

2. USSR (600)

"The Equilibrium of the Fusions of Bi_2S_3 --Bi with Hydrogen and the Activity of the Components of the Fusion" Zhur. Fiz. Khim, 13, No. 9, 1939. Moscow, NIIKh under the MGU (Moscow State University), Laboratory of Chemical Thermodynamics.
Received 11 Jan 1939.

9. Report U-1615, 3 Jan 1952

1. GERASIMOV, Ya. I.; SLUCHANKO, B. C.; GAMBURG, L. V.

2. USSR (600)

"The Thermic Dissolution of Sulfides of Vanadium," *Zhur. Fiz Khim*, 13, No. 10, 1939.
MGU, NIIKH, laboratory of Chemical Thermodynamics. Received 11 Jan 1939.

9. ~~SECRET~~ Report U-1615, 3 Jan. 1952

6

PROCESSING AND PROPERTIES INDEX

The thermal dissociation of bismuth sulfide. H. Ya. I. Gerasimov, *J. Gen. Chem.* 31, 8, 8, 10, 1960, 2 (1960), 31, 1, 31, 3169. Bi_2S_3 is heated at 1000°C for 2 hrs. and then in a H_2S stream at 1000°C for 2 hrs. In a N_2 stream the dissociation pressure of Bi_2S_3 as measured by the equil. pressure of S vapor, is 0.8 mm at 1000°C and 13 mm at 1050°C. No other sulfide is formed, and attempts to prep. a sulfide containing S than Bi_2S_3 by the direct action of S on Bi_2S_3 were unsuccessful. H. M. Langer.

ADDITIONAL LITERATURE CLASSIFICATION

1000-100000

1000-100000

CA

Thermodynamics of solutions at high temperatures and its application to theoretical metallurgy. V. I. Gerasimov. *Zhurnal Khim. Fiz.* 14, 20 (1941). Review. Sixty references. Ivar Igelstrud

ASAC 31.4 METALLURGICAL LITERATURE CLASSIFICATION

12000 SYMBOLS

10000 MAP ONE USE

10000 MAP ONE USE

10000 MAP ONE USE

PROCEDURES AND PROPERTIES INDEX	
1051. PHYSICOCHEMICAL PROPERTIES OF SOLID, LIQUID AND GASEOUS FUELS AND THE THEORY OF THEIR CLASSIFICATION. Gerasimov, Y. A. (Za Ekonomiyu Topliva, 1946, 3, No.2/3, 22-33; Chem. Abstr., 1946, 40, 6780).	0
<p>The "hydrocarbon bond index" (u_o) is the ratio of the volume of O required to burn 1 kg. of fuel containing inactive (fixed) O to the volume of CO_2 and SO_2 obtained in theoretical combustion. $u_o = (V_o + 0.033 O) / 0.089 K = 1 + (3H/K) = 20.9/X_o$, where V_o, the volume air required to burn 1 kg. of fuel in theoretical combustion, is given by $0.089 C + 0.267 H + 0.033 S - 0.033 O$ cu.m. per kg. of fuel; $K = C + 0.368 S$, and X_o, the volume of $CO_2 + SO_2$ obtained from 1 kg. of fuel is given by $K/0.54 (V_o + 0.033 O)$. The value 20.9 is the O content in the air. The "oxygen index". (N_o) is given by $(V_o + 0.033 O) / V_o = X_y/X_o$, where X_y is the volume of $CO_2 + SO_2$ produced in burning 1 kg. of fuel containing active O and X_y, the percentage based on $CO_2 + SO_2$ of air required for theoretical combustion is given by $X_y = K/0.54V_o$. There is no O in the ultimate analysis of liquid</p>	
<p>410-11.4 METALLURGICAL LITERATURE CLASSIFICATION</p>	
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